

COMMONWEALTH OF VIRGINIA
Department of Environmental Quality
Valley Regional Office

STATEMENT OF LEGAL AND FACTUAL BASIS

Shenandoah County Sanitary Landfill
Shenandoah County, Virginia
Permit No. VRO81401

Title V of the 1990 Clean Air Act Amendments required each state to develop a permit program to ensure that certain facilities have federal Air Pollution Operating Permits, called Title V Operating Permits. As required by 40 CFR Part 70 and 9 VAC 5 Chapter 80, Shenandoah County has applied for a Title V Operating Permit for its landfill in Shenandoah County, Virginia. The Department has reviewed the application and has prepared a draft Title V Operating Permit.

Engineer/Permit Contact:_____ Date: 10/19/04

Air Permit Manager:_____ Date: 10/19/04

Deputy Regional Director:_____ Date: 10/22/04

FACILITY INFORMATION

Permittee

Shenandoah County
P.O. Box 452
Woodstock, VA 22664

Facility

Shenandoah County Sanitary Landfill
349 Landfill Road
Edinburg, Virginia 22824

Plant ID No.: 51-171-0086

SOURCE DESCRIPTION

SIC Code 4953 – Refuse Systems

The Shenandoah County Sanitary Landfill is a municipal solid waste (MSW) management facility located approximately three miles north of Edinburg, Virginia. The total area within the facility boundary is approximately 214 acres. The first landfill cells constructed and approved under the Virginia Department of Health (VDH) Permit No. 78 are at the extreme southern property boundary and were opened in 1972 and closed in 1987 (designated as EU-1). Of the 68 acres of available disposal area remaining, approximately 30 acres are occupied by the old closed cells (closed in 1995 and designated as EU-2), and the recently closed area (closed in 2003 and designated as EU-3). The remaining 38 acres are occupied by the expansion area cell (designated as EU-4) which was opened in 2003 and is currently accepting waste. The parcels containing these four waste management units (EU-1, EU-2, EU-3 and EU-4) are contiguous and county-owned property, hence all four units are considered as a single disposal facility.

The permitted design capacity of the Shenandoah County Landfill is greater than 2.5 million m³ (See Attachment A). Therefore, the landfill is regulated according to New Source Performance Standards (NSPS) Subpart WWW. As stated in 40 CFR §60.752 (b), landfills above the 2.5 million m³ design capacity are subject to Title V permitting requirements. This source is located in an attainment area for all pollutants. The facility is currently permitted under a minor NSR permit dated August 6, 2004.

COMPLIANCE STATUS

The facility is inspected once a year. The facility was last inspected on May 19, 2003, and was determined to be in compliance.

EMISSION UNIT AND CONTROL DEVICE IDENTIFICATION

The emissions units at this facility consist of the following:

Table I. Significant Emission Units

Emission Unit ID	Stack ID	Emission Unit Description	Size/Rated Capacity	Pollution Control Device Description (PCD)	PCD ID	Pollutant Controlled	Applicable Permit Date**
Landfills							
EU-1	F-1	Closed (1987) MSW Landfill – VDH Permit No. 78	1,067,685 cubic yard	-	-	-	08/06/04
EU-2	F-2	Old Closed (1995) MSW Landfill – VDEQ Permit No. 469	1,505,203 cubic yard	-	-	-	08/06/04
EU-3	F-3	Recently Closed (2003) MSW Landfill – VDEQ Permit No. 469	188,084 cubic yard	-	-	-	08/06/04
EU-4	F-4	Landfill Expansion Cell (Opened 2003) – VDEQ Permit No. 469	3,696,740 cubic yard	-	-	-	08/06/04
Landfill Surface and Roads							
EU-5	F-5	MSW Landfill Surface and Access Roads	-	-	-	-	08/06/04

EMISSIONS INVENTORY

A copy of the 2003 annual emission update is attached as Attachment B. Emissions are summarized in the following tables:

Table II. 2003 Actual Criteria Pollutant Emissions for the Shenandoah County Landfill

Emission Unit	Criteria Pollutant Emissions in Tons/Year					
	NMOC	VOC	CO	SO ₂	PM-10	NO _x
Landfills (EU1-EU4)	6.1	2.36	-	-	-	-
Landfill Surface and Roads (EU5)	-	-	-	-	25.3	-
Others (Insignificant Sources)	-	1.34	0.5	0.2	0.2	1.9
Total	6.1	3.7	0.5	0.2	25.5	1.9

Table III. 2003 Actual Hazardous Air Pollutant (HAP) Emissions for the Shenandoah County Landfill

Pollutant	Hazardous Air Pollutant Emissions in Tons/Year
Total HAPs	0.5

EMISSION UNIT APPLICABLE REQUIREMENTS - (EU1 – EU4 LANDFILLS)

Limitations

Shenandoah County Sanitary Landfill is subject to 40 CFR 60, Subpart WWW - New Source Performance Standards (NSPS) for Municipal Solid Waste Landfills. The following limitations are state BACT and/or other applicable requirements from the minor NSR permit dated August 6, 2004 and Subpart WWW requirements. Please note that the condition numbers are from the 2004 permit. A copy of the permit is enclosed as Attachment C.

Condition 3: design capacity shall not exceed 4.94 million cubic meters

Condition 4: landfill gas (LFG) collection and control system requirements in the event NMOC emission rate would ever be equal to greater than 50 Mg/yr

Being subject to the NSPS means that Shenandoah County Sanitary Landfill is also subject to 40 CFR 60, Subpart A - General Provisions. All applicable limitations from Subparts A and WWW have been

included in the permit. Note that Condition 4 does not currently require the facility to install a LFG collection and control system. However, Condition 4 requires the facility to submit a collection and control design plan and install a collection and control system in compliance with 40 CFR §60.752 (b)(2) in the event NMOC emission rate would ever equal to or greater than 50 Mg/yr. The facility's only applicable requirements at this time are monitoring, recordkeeping and reporting.

Monitoring and Recordkeeping

As per 40 CFR Part 64, Compliance Assurance Monitoring (CAM), emission limitations or standards proposed after November 15, 1990 pursuant to Section 111 or 112 are exempt from CAM (40 CFR §64.2 (b)(1)). All applicable monitoring requirements from Subpart WWW have been included in the permit. Since Subpart WWW was promulgated on March 1996 under the authority of Section 111 of the New Source Performance Standards (NSPS), the affected facilities subject to this standard i.e., the municipal solid waste landfills, are exempt from CAM and no additional monitoring has been incorporated into the Title V permit.

The monitoring and recordkeeping requirements in Conditions 7 and 14 of the minor NSR permit dated August 6, 2004, have been included in the permit. These requirements will meet Part 70 monitoring requirements.

The permittee shall maintain records including the design capacity of the landfill, the current amount of solid waste in place, and the year-by-year waste acceptance rate.

Actual emissions from the operation of the landfill shall be calculated using either of the following equations (Equation 1 or 2):

$$M_{NMOC} = \sum_{i=1}^n 2kL_o M_i (e^{-kt_i}) (C_{NMOC}) (3.6 \times 10^{-9})$$

.....Equation 1

M_{NMOC}	= total NMOC emission rate from the landfill, megagrams per year
k	= methane generation rate constant, year ⁻¹
L_o	= methane generation potential, cubic meters per megagram solid waste
M_i	= mass of solid waste in the i th section, megagrams
t_i	= age of the i th section, years
C_{NMOC}	= concentration of NMOC, parts per million by volume as hexane
3.6×10^{-9}	= conversion factor

The mass of nondegradable solid waste may be subtracted from the total mass of solid waste in a particular section of the landfill when calculating the value for M_i if documentation of the nature and amount of such wastes is maintained.

$$M_{NMOC} = 2L_o R(e^{-kc} - e^{-kt})(C_{NMOC})(3.6 \times 10^{-9})$$

.....Equation 2

M_{NMOC}	= mass emission rate of NMOC from the landfill, megagrams per year
L_o	= methane generation potential, cubic meters per megagram solid waste
R	= average annual acceptance rate, megagrams per year
k	= methane generation rate constant, year ⁻¹
t	= age of the landfill, years
C_{NMOC}	= concentration of NMOC, parts per million by volume as hexane
c	= time since closure, years (for an active landfill $c = 0$ and $e^{-kc} = 1$)
3.6×10^{-9}	= conversion factor

The mass of nondegradable solid waste may be subtracted from the average annual acceptance rate when calculating a value for R , if documentation of the nature and amount of such wastes is maintained.

Reporting Requirements

The reporting required in the Title V permit has been incorporated from Conditions 15, 16, 17, 18, 19 and 20 of the minor NSR permit dated August 6, 2004. Since the NMOC emission rate is less than 50 Mg/yr, reporting requirements related to a collection and control system have not been incorporated into the permit. However, Condition 17 requires the facility to submit a collection and control design plan and install a collection and control system in compliance with 40 CFR §60.752 (b)(2) in the event NMOC emission rate would ever equal to or greater than 50 Mg/yr.

Compliance Assurance Monitoring (CAM) Applicability

CAM does not apply to the MSW landfill as this landfill is subject to emission limitations in New Source Performance Standards (NSPS) proposed after November 15, 1990. This landfill is subject to 40 CFR 60, Subpart WWW that was effective on March 1996.

Testing

The permit requires testing of the site-specific NMOC concentration using the procedures described in 40 CFR 60, Subpart WWW. Also, a test method to develop a site-specific methane generation rate

constant is provided in the permit, if needed.

Streamlined Requirements

The following applicable requirements have not been included for the reasons provided:

40 CFR §60.7 (a)(1) Requirements of the Notification of the Date Construction is Commenced

The facility submitted notification of the landfill modification on December 8, 2003. The new cell construction commenced on April 8, 2002 and the new cell first accepted waste on May 15, 2003.

40 CFR §60.757 (a) - Initial Design Capacity Submittal Requirement

On September 26, 1996, the facility submitted the initial design capacity report. The modified design capacity report was submitted on August 5, 2002. In addition, a later revision to the design capacity report was submitted on April 30, 2004.

40 CFR §60.757 (b) - Initial Non Methane Organic Compounds (NMOC) Emission Rate Report Requirement

On August 5, 2002, the facility submitted a NMOC emission rate report. A copy of the report is shown in Attachment C. As per the report, the 1997 NMOC emission estimate for the landfill was 294 Mg/yr. Since the NMOC emission rate exceeded 50 Mg/yr, the facility was required to determine a site-specific NMOC concentration and recalculate the NMOC emission rate under Tier 2 procedures, **or** submit a collection and control system design plan prepared by a professional engineer within one year of the report and comply with 40 CFR §60.752 (b)(2). The facility notified DEQ that Tier 2 sampling would be done and a revised NMOC emission rate would be submitted.

40 CFR §60.757 (c)(1) - Non Methane Organic Compounds (NMOC) Emission Rate Report Requirement under Tier 2 sampling

On May 20, 2003, the facility determined the site-specific NMOC concentration and recalculated the NMOC emission rate. The site-specific NMOC concentration and Tier 2 NMOC emission rate report were submitted on August 25, 2003. As per the report, the 2003 NMOC emission rate for the landfill was 4.9 Mg/yr. Since the NMOC emission rate is under 50 Mg/yr, the facility is not required to submit a collection and control system design plan at this time. The facility submitted a revised NMOC emission rate report on April 13, 2004. As per

the revised report, the 2003 NMOC emission rate for the landfill was 5.59 Mg/yr. A copy of the report is provided in Attachment D.

Condition 9 of the minor NSR permit dated 08/06/2004

This condition has not been included as all applicable requirements from 40 CFR 60, Subpart WWW have been included in the permit.

Condition 21 of the minor NSR permit dated 08/06/2004

This condition has not been included as this requirement is already included in the General Conditions Section of the Title V permit (Condition VII.M).

EMISSION UNIT APPLICABLE REQUIREMENTS - (Facility Wide - Landfill Surface and Roads)

Limitations

The following limitations are state BACT and other applicable requirements from the minor NSR permit dated August 6, 2004. Please note that the condition numbers are from the 2004 permit. A copy of the permit is enclosed as Attachment C.

Condition 5: fugitive dust emission control requirements

Condition 6: dust control plan requirement

Condition 8: visible emissions limit

Monitoring and Recordkeeping

The monitoring and recordkeeping requirements in Conditions 13 and 14 of the minor NSR permit dated August 6, 2004, have been included in the permit.

In lieu of conducting periodic evaluations using EPA Method 9 to demonstrate compliance with the facility-wide visible emission limit, the permittee shall perform a daily visual survey of the trafficable roads at the site and landfill activities for sources of excessive emissions. The reason for not requiring EPA Method 9 is that there is no stack in the landfill to perform the test. The presence of excessive emissions shall require further investigation as to the cause of the emissions and timely corrective action shall be required. All observations and corrective actions taken shall be logged and recorded. These records shall be available on-site for inspection by the DEQ and shall be current for the most recent five

(5) years.

There is reasonable assurance that violations of the visible emission standard should not occur if the permittee complies with the permit condition to mitigate fugitive dust, implements the operating procedures included in the dust control plan, performs a daily visible emission survey and conducts timely corrective actions as needed.

Testing

The permit does not require source emission tests. A table of test methods has been included in the permit if further testing for compliance purposes is performed. The Department and EPA have authority to require testing not included in this permit if necessary to determine compliance with an emission limit or standard.

Reporting

No specific reporting has been included for landfill surface and roads.

Streamlined Requirements

There are no streamlined requirements for landfill surface and roads.

GENERAL CONDITIONS

The permit contains general conditions required by 40 CFR Part 70 and 9 VAC 5-80-110 that apply to all Federal operating permit sources. These include requirements for submitting semi-annual monitoring reports and an annual compliance certification report. The permit also requires notification of deviations from permit requirements or any excess emissions.

STATE-ONLY APPLICABLE REQUIREMENTS

Shenandoah County Sanitary Landfill did not identify any state-only requirements in their application. Therefore, no state-only requirements have been included in the permit.

INAPPLICABLE REQUIREMENTS

This facility is not subject to 40 CFR Part 63, Subpart AAAA - National Emission Standards for Hazardous Air Pollutants for Municipal Solid Waste Landfills. This standard does not apply because this facility is not (1) a major source of hazardous air pollutants (HAPs); (2) collocated with a major source of HAPs; (3) an area source with a design capacity greater than or equal to 2.5 million m³ and

2.5 million Mg with estimated uncontrolled NMOC emissions equal to or greater than 50 Mg/yr; or (4) an active area source landfill with a design capacity greater than or equal to 2.5 million m³ and 2.5 million Mg that operates an anaerobic bioreactor.

COMPLIANCE PLAN

Shenandoah County Sanitary Landfill is currently in compliance with all applicable requirements. No compliance plan was included in the application or in the permit.

INSIGNIFICANT EMISSION UNITS

The insignificant emission units are presumed to be in compliance with all requirements of the Clean Air Act as may apply. Based on this presumption, no monitoring, recordkeeping or reporting shall be required for these emission units in accordance with 9 VAC 5-80-110.

Table IV. Insignificant Emission Units

Emission Unit No.	Emission Unit Description	Citation ¹ (9 VAC_)	Pollutant(s) Emitted (5-80-720 B)	Rated Capacity (5-80-720 C)
EU-6	MSW Leachate Storage Lagoon	5-80-720 B	VOC	-
EU-7	Two (2) Diesel-fired Wood Chippers	5-80-720 B	NO _x , CO, SO ₂ , PM-10, VOC	-
EU-8	Diesel-fired Tire Shredder	5-80-720 B	NO _x , CO, SO ₂ , PM-10, VOC	-
EU-9	Above Ground Fuel Storage Tanks	5-80-720 B	VOC	-
EU-10	Co-compost Facility	5-80-720 B	VOC	-

¹The citation criteria for insignificant activities are as follows:

9 VAC 5-80-720 A - Listed Insignificant Activity, Not Included in Permit Application

9 VAC 5-80-720 B - Insignificant due to emission levels

9 VAC 5-80-720 C - Insignificant due to size or production rate

CONFIDENTIAL INFORMATION

The permittee did not submit a request for confidentiality. Therefore, all portions of the Title V application are suitable for public review.

PUBLIC PARTICIPATION

A public notice regarding the draft permit was placed in the Northern Virginia Daily, Strasburg, Virginia, on September 3, 2004. EPA was sent a copy of the draft permit and notified of the public notice on August 31, 2004. West Virginia, the only affected state, was sent a copy of the public notice in e-mail dated September 3, 2004. All persons on the Title V mailing list were also sent a copy of the public notice in e-mail dated September 3, 2004.

Public comments were accepted from September 3, 2004 to October 4, 2004. No comments were received from the public, the affected state and the EPA regarding the draft permit.

ATTACHMENTS

The following information is attached:

ATTACHMENT A: Design Capacity of the Landfill

ATTACHMENT B: 2003 Annual Emissions Update

ATTACHMENT C: Minor NSR Permit dated 08/06/2004

ATTACHMENT D: NMOC Emission Rate Report under Tier 2 NMOC Sampling

ATTACHMENT A

Design Capacity of the Landfill

Attachment for Modified Initial Design Capacity Report
Shenandoah County Sanitary Landfill—VDEQ Solid Waste Permit 469 (Amended)
 Edinburg, Virginia

REVISED April 30, 2004

Landfill Unit	Date of Initial Design Report Submittal	Date Permit Issued	Date Construction Started	Date Waste First Accepted	Design Capacity (m ³) [yd ³]	P/C ^c	Depth of Refuse (ft)	Refuse Acceptance Rate (tons/day)	Compaction Practices
EU-1 VDH Permit No. 78 Pre-VSWMR Closed MSW Cells	NA	Unknown	Unknown	Unknown	(816,304) [1,067,685]	C	Unknown	Unknown	Unknown
EU-2 VDEQ Permit 469 Closed MSW Cells (1995)	NA	April 5, 1985	Unknown	Unknown	(1,150,810) ^a [1,505,203]	C	25-80 ^d	244 ^h	Two (2) Caterpillar Landfill Compactors; 5-7 passes; approximately 1200 lbs/cy ³ minimum density
EU-3 VDEQ Permit 469 Closed MSW Cells (2003)	Aug. 30, 1996	Apr. 4, 1985	1987	1988	(143,801) ^b [188,084]	C	25-80 ^d	244 ^h	Two (2) Caterpillar Landfill Compactors; 5-7 passes; approximately 1200 lbs/cy ³ minimum density
EU-4 VDEQ Permit 469 (Amended) Active Cells (opened 2003)	July 2, 2002	Oct. 2, 2000	Apr. 8, 2002	2003	(2,826,361) ^e [3,696,740]	P	115'	202 ^g	Two (2) Caterpillar Landfill Compactors; 5-7 passes; approximately 1200 lbs/cy ³ minimum density
Total Facility-wide Design Capacity=					(4,937,275) [6,457,712]				

Notes:

- a Based upon original design elevation of 930 MSL permitted design capacity was 1,505,203 CY (1,158,524 m³).
- b Permission granted later by VDEQ to go from elevation 930 MSL to elevation 975 MSL (vertical expansion), which added an additional 188,084 CY (143,810 m³) to the allowable design capacity for a total capacity of 1,693,287 CY (1,302,334 m³).
- c P=permitted design capacity; C=calculated design capacity.
- d Landfill baseliner is sloped.
- e Based upon permitted design capacity
- f Approximate maximum depth of waste. Liner bottom undulates and cap elevation slopes, so difficult to quantify average depth of waste.
- g Average daily rate based on 30-year lifespan and 1200 lbs/yd³.
- h Average daily rate based on capacity of EU-2 and EU-3 over active life of units.

DEQ-VALLEY

JUN 2 5 2004

TO: _____
 FILE: _____

ATTACHMENT B
2003 Annual Emissions Update



VIRGINIA DEPARTMENT OF
ENVIRONMENTAL QUALITY

EMISSION STATEMENT CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering and evaluating the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

(see reverse side for instructions)

SIGNATURE: V. E. Poling DATE: 4/15/04
PRINTED NAME: VINCENT E. Poling
TITLE: County Administrator
COMPANY: Shenandoah County Board of Supervisors
REGISTRATION NUMBER: 81401
TELEPHONE NUMBER: 540-459-6165

[illegible]**Summary Data for Calendar Year: 2012**

DEQ-VALLEY

APR 13 2004

TO: _____
FILE: _____

331 Landfill (W08²⁴4469) 50100452 30 Acres LF
Closed 1995
441 Landfill (V04#78) 50100402 22 Acres LF
Closed 1987

Post-It Fax Note	7671	Date	4/8/04	# of pages	1
To	Bellef Barbers	From	Kelly S		
Co./Dept.		Co.	DEG - CREW		
Phone #		Phone #	340.574.7843		
Fax #	416/842.7728	Fax #	7407		

1-800-
County Administrator
4/15/04



VIRGINIA DEPARTMENT OF
ENVIRONMENTAL QUALITY

2003 EMISSION STATEMENT

Please correct any errors in the information below (cross out & replace)

FACILITY NAME Shenandoah County Sanitary Landfill—VDEQ Permit 469	REGISTRATION # 81401	CONTACT PERSON Henry Mikus, Director	
LOCATION ADDRESS 349 Landfill Road Edinburg, Virginia 22824		JURISDICTION Shenandoah County, VA	
MAILING ADDRESS 349 Landfill Road	MAILING CITY AND STATE Edinburg, Virginia	ZIPCODE 22824	
PARENT COMPANY (IF APPLICABLE)	TELEPHONE NUMBER (540) 984-8573	PRIMARY SIC CODE 4953	FOR Agency use only

FACILITY TOTALS (Sum emissions from attached pages)

	ANNUAL	OZONE SEASON
TOTAL VOC EMISSIONS FOR 2003	3.7 TONS/YR	20 LBS/DAY
TOTAL NO _x EMISSIONS FOR 2003	1.9 TONS/YR	12 LBS/DAY
TOTAL SO ₂ EMISSIONS FOR 2003	0.2 TONS/YR	NA
TOTAL PM ₁₀ EMISSIONS FOR 2003	25.5 TONS/YR	NA
TOTAL PB EMISSIONS FOR 2003	- TONS/YR	NA
TOTAL TRS EMISSIONS FOR 2003	0.6 TONS/YR	NA
TOTAL TNMOC EMISSIONS FOR 2003 (landfills only)	6.1 TONS/YR	NA
TOTAL non-VOC/non-PM HAP EMISSIONS FOR 2003	0.5 TONS/YR	NA
TOTAL CO EMISSIONS FOR 2003	0.5 TONS/YR	NA
TOTAL PM _{2.5} EMISSIONS FOR 2003	6.4 TONS/YR	NA
TOTAL NH ₃ EMISSIONS FOR 2003	1.2 TONS/YR	NA

PLEASE ATTACH "ANNUAL UPDATE" FORM.

PLEASE ATTACH "EMISSION STATEMENT CERTIFICATION" with appropriate signature.

ATTACHMENT C
Minor NSR Permit dated 08/06/2004



COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

STATIONARY SOURCE PERMIT TO CONSTRUCT AND OPERATE

**This permit includes designated equipment subject to
New Source Performance Standards (NSPS).**

This permit supercedes your permit dated December 10, 2003.

In compliance with the Federal Clean Air Act and the Commonwealth of Virginia
Regulations for the Control and Abatement of Air Pollution,

Shenandoah County Sanitary Landfill
349 Landfill Road
Edinburg, Virginia 22824
Registration No.: 81401
Plant ID No.: 51-171-0086

is authorized to construct and operate

a municipal solid waste landfill

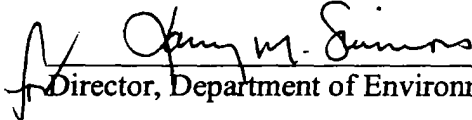
located at

349 Landfill Road
Edinburg, Virginia

in accordance with the Conditions of this permit.

Approved on

August 6, 2004



Director, Department of Environmental Quality

Permit consists of 10 pages.
Permit Conditions 1 to 28.

PERMIT CONDITIONS - the regulatory reference or authority for each condition is listed in parentheses () after each condition.

APPLICATION

1. Except as specified in this permit, the permitted facility is to be constructed and operated as represented in the permit application dated July 30, 2002, August 26, 2003 and May 7, 2004, including supplementary information dated September 18, 2002, September 27, 2002, October 17, 2003, and April 30, 2004. Any changes in the permit application specifications or any existing facilities which alter the impact of the facility on air quality may require a permit. Failure to obtain such a permit prior to construction may result in enforcement action.
(9 VAC 5-50-390 and 9 VAC 5-80-1210 D)

PROCESS REQUIREMENTS

2. **Equipment List** - Equipment to be constructed at this facility consists of:
 - a municipal solid waste (MSW) landfill (NSPS) with a total capacity not to exceed 4.94 million m³ of solid waste.
(9 VAC 5-80-1100)
3. **Design Capacity** - The design capacity of the MSW landfill shall not exceed 4.94 million cubic meters. A change in the design capacity may require a permit to modify and operate.
(9 VAC 5-80-1180)
4. **Landfill Gas (LFG) Collection and Control System: Design and Operational Standards**
The permittee shall install a LFG collection and control system that captures the gas generated within the landfill as required by 40 CFR § 60.752 (b) (2) (ii) (A) or (B) and 40 CFR § 60.752 (b) (2) (iii) within 30 months after the first annual non methane organic compounds (NMOC) emission rate report, required in Condition 15, in which the NMOC emission rate equals or exceeds 50 megagrams per year, unless Tier 2 or Tier 3 sampling demonstrates that the NMOC emission rate is less than 50 megagrams per year.
(9 VAC 5-50-410 and 40 CFR § 60.752 (b))
5. **Pollution Prevention** - Unless otherwise specified, fugitive dust emission controls shall include the following or equivalent as a minimum:
 - a. Dust from grading, cell construction, waste compaction, application of daily cover, wood waste chipping operations, storage piles and traffic areas shall be controlled by wet suppression or equivalent (as approved by the DEQ) control measures.
 - b. All material being stockpiled shall be kept moist to control dust during storage and handling, or covered to minimize emissions.

- c. Dust from haul roads shall be controlled by wet suppression and prompt removal of dried sediment resulting from soil erosion and dirt spilled or tracked onto paved surfaces within the landfill.
- d. Reasonable precautions shall be taken to prevent deposition of dirt on public roads and subsequent dust emissions. Dirt spilled or tracked onto paved surfaces shall be promptly removed to prevent particulate matter from becoming airborne.

(9 VAC 5-80-1180 and VAC 5-50-90)

6. **Dust Control Plan** - In order to minimize the duration and frequency of excess emissions, the permittee shall implement the DEQ approved Dust Control Plan which outlines the preventive measures to be implemented for dust control at the landfill. The plan shall include the following minimum requirements as approved by DEQ:

- a. Identification of the personnel responsible for overseeing dust control,
- b. Description and the frequency of measures to be taken to prevent excess emissions from grading, cell construction, waste compaction and daily cover application,
- c. Description and the frequency of measures to be taken to prevent excess emissions from storage piles and stockpiling operations,
- d. Description and the frequency of measures to be taken to prevent dust from haul roads and other unpaved surfaces, and description and the frequency of measures to be taken to prevent deposition of dirt on paved surfaces within the landfills and access roads entering the landfill.

(9 VAC 5-80-1180)

7. **Emissions Calculations** - The permittee shall use either of the following equations (Equation 1 or Equation 2) to calculate the annual NMOC emission rate. The default values to be used in both equations are 0.05 per year for k, 170 cubic meters per megagram for L_O , and 4000 parts per million by volume as hexane for C_{NMOC} . If obtained, the site-specific value for C_{NMOC} , as determined by using the procedure specified in Condition 10, and/or the site-specific value for k, as determined by using the procedure specified in Condition 11, shall be used in lieu of the default value for C_{NMOC} and/or k in calculating the NMOC emission rate.

- a. Equation 1 shall be used if the actual year-to-year solid waste acceptance rate is known:

$$M_{NMOC} = \sum_{i=1}^n 2kL_O M_i (e^{-kt_i}) (C_{NMOC}) (3.6 \times 10^{-9})$$

.....Equation 1

M_{NMOC} = Total NMOC emission rate from the landfill, megagrams per year
 k = methane generation rate constant, year⁻¹
 L_O = methane generation potential, cubic meters per megagram solid waste
 M_i = mass of solid waste in the i^{th} section, megagrams
 t_i = age of the i^{th} section, years
 C_{NMOC} = concentration of NMOC, parts per million by volume as hexane
 3.6×10^{-9} = conversion factor

The mass of nondegradable solid waste may be subtracted from the total mass of solid waste in a particular section of the landfill when calculating the value for M_i if documentation of the nature and amount of such wastes is maintained.

- b. Equation 2 shall be used if the actual year-to-year solid waste acceptance rate is unknown:

$$M_{NMOC} = 2L_O R(e^{-kt} - e^{-k_c t})(C_{NMOC})(3.6 \times 10^{-9})$$

.....Equation 2

M_{NMOC} = mass emission rate of NMOC from the landfill, megagrams per year
 L_O = methane generation potential, cubic meters per megagram solid waste
 R = average annual acceptance rate, megagrams per year
 k = methane generation rate constant, year⁻¹
 t = age of the landfill, years
 C_{NMOC} = concentration of NMOC, parts per million by volume as hexane
 c = time since closure, years (for an active landfill $c = 0$ and $e^{-k_c t} = 1$)
 3.6×10^{-9} = conversion factor

The mass of nondegradable solid waste may be subtracted from the average annual acceptance rate when calculating a value for R , if documentation of the nature and amount of such wastes is maintained.

(9 VAC 5-50-410 and 40 CFR § 60.754 (a) (1))

OPERATING/ EMISSION LIMITATIONS

8. **Visible Emission Limit** - Visible emissions from the facility shall not exceed 20% opacity as determined by EPA Method 9 (reference 40 CFR Part 60, Appendix A), except for one six-minute period in any one hour which shall not exceed 30% opacity.
(9 VAC 5-50-80)
9. **Operation of Landfill** - Except where this permit is more restrictive than the applicable requirement, the MSW landfill shall be operated in accordance with 40 CFR 60, Subpart WWW.
(9 VAC 5-50-400 and 9 VAC 5-50-410)

TESTING

10. **Tier 2 Testing** - When determining the Tier 2 site-specific NMOC concentration, the permittee shall use the following sampling procedure. The permittee shall install at least two sample probes per hectare of landfill surface that has retained waste for at least 2 years. If the landfill is larger than 25 hectares in area, only 50 samples are required. The sample probes should be located to avoid known areas of nondegradable solid waste. The permittee shall collect and analyze one sample of landfill gas from each probe to determine the NMOC concentration using Method 25C of Appendix A of 40 CFR Part 60 or Method 18 of Appendix A of 40 CFR Part 60. If using Method 18 of Appendix A of 40 CFR Part 60, the minimum list of compounds to be tested shall be those published in the most recent Compilation of Air Pollutant Emission Factors (AP-42). If composite sampling is used, equal volumes shall be taken from each sample probe. If more than the required number of samples are taken, all samples shall be used in the analysis. The permittee shall divide the NMOC concentration from Method 25C of Appendix A of 40 CFR Part 60 by six to convert from C_{NMOC} as carbon to C_{NMOC} as hexane.
(9 VAC 5-50-410 and 40 CFR § 60.754 (a) (3))
11. **Tier 3 Testing**– The Tier 3 site-specific methane generation rate constant shall be determined using the procedure provided in 40 CFR Part 60, Appendix A, Method 2E.
(9 VAC 5-50-410 and 40 CFR § 60.754 (a) (4))
12. **Alternate Method Testing** – The permittee may use other methods to determine the NMOC concentration or a site-specific methane rate generation constant as an alternative to the methods required in Conditions 10 and 11 if the method has been approved by the EPA.
(9 VAC 5-50-410 and 40 CFR § 60.754 (a) (5))

CONTINUING COMPLIANCE DETERMINATION

13. **Visual Survey** - At least daily, the permittee shall visually survey the trafficable roads at the site and landfill activities for any sources of excessive fugitive emissions. For the purpose of this survey, excessive emissions are considered to be any visible emissions that leave the facility site boundaries. The presence of excessive fugitive emissions shall require further investigation as to the cause of the emissions and timely corrective action shall be taken. If water is used to control the fugitive dust emissions, the permittee shall take care not to create a water quality problem from surface water runoff. All observations and corrective actions taken shall be logged and recorded.
(9 VAC 5-80-1180)

RECORDS

14. **On Site Records** - The permittee shall maintain records of all emission data and operating parameters necessary to demonstrate compliance with this permit. The content of and format of such records shall be arranged with the Director, Valley Regional Office. These records shall include, but are not limited to:

- a. Readily accessible, on-site records of the maximum design capacity.
- b. Annual calculated mass emission rate of NMOC from the landfill.
- c. The current amount of solid waste in-place.
- d. The year-by-year or average waste acceptance rate.
- e. Site-specific values for C_{NMOC} and k , if obtained.
- f. Age of landfill.
- g. Description, location, amount, and placement date of all nondegradable refuse including asbestos and demolition refuse placed in landfill areas, which are excluded from landfill gas estimation.
- h. Installation date and location of all vents.
- i. A copy of the DEQ-approved Dust Control Plan.
- j. Daily logs of the visual survey of the trafficable roads at the site and landfill activities to include the following:
 - i. The date, time, and name of the person performing each inspection;
 - ii. Whether or not excessive fugitive emissions are observed and the suspected cause of such emissions; and
 - iii. The date, time, and type of corrective actions taken.

These records shall be available for inspection by the DEQ and shall be current for the most recent five years. Off-site records may be maintained if they are retrievable within 4 hours. Either paper copy or electronic formats are acceptable.
(9 VAC 5-50-50, 9 VAC 5-50-410 and 40 CFR § 60.758)

NOTIFICATION AND REPORTING

- 15. Annual NMOC Emission Report** - Not later than April 15 of each year, the permittee must submit an annual NMOC emission rate report to the Director, Valley Regional Office. The NMOC emission rate shall be calculated in accordance with the methodology contained in Condition 7. The report shall include all data, calculations, sample reports and measurements used to estimate the emissions.
(9 VAC 5-50-410 and 40 CFR § 60.757 (b))

16. Requirements When Reported NMOC Emission Rate > 50 Mg/yr - If the reported NMOC emission rate, in the annual report, is equal to or exceeds 50 megagrams per year, the permittee shall:

- a. Submit a LFG gas collection and control system design plan as per 40 CFR § 60.752 (b) (2); or
- b. Within 180 days of the emission rate report in Condition 15, demonstrate, using a site-specific NMOC concentration (Tier 2), that NMOC emissions do not equal or exceed 50 megagrams per year, submit a revised NMOC emission rate report, resume annual NMOC emission rate reporting, and retest the site-specific NMOC concentration every 5 years.

(9 VAC 5-50-410, 40 CFR § 60.752 (b) (2) and 40 CFR § 60.757 (c) (1))

17. Requirements When NMOC Emission Rate > 50 Mg/yr (when using site-specific C_{NMOC}) - If, using a site-specific NMOC concentration, the NMOC emission rate is equal to or exceeds 50 megagrams per year, the permittee shall:

- a. Submit a LFG collection and control system design plan as per 40 CFR § 60.752 (b) (2), or
- b. Within 1 year of the emission rate report in Condition 15, demonstrate using a site-specific methane generation constant (Tier 3), that NMOC emissions do not equal or exceed 50 megagrams per year, submit a revised NMOC emission rate report and resume annual NMOC emission rate reporting.

(9 VAC 5-50-410, 40 CFR § 60.752 (b) (2) and 40 CFR § 60.757 (c) (2))

18. LFG Collection and Control System Design Plan - The LFG collection and control system design plan required by Condition 16 or Condition 17 shall be submitted to the Director, Valley Regional Office, within one year after submitting the NMOC emission rate report required in Condition 15, reporting an NMOC emission rate which equals or exceeds 50 megagrams per year.

(9 VAC 5-50-410 and 40 CFR § 60.752 (b) (2) (i))

19. Solid Waste Permit Amendment - If the permittee is required to install a gas collection and control system according to the provisions of 9 VAC 5-50-410 Subpart WWW, the permittee shall apply for a solid waste permit amendment in accordance with Part VII (9 VAC 20-80-480 et seq.) of 9 VAC 20 Chapter 80 (Solid Waste Management Regulations).

(9 VAC 5-80-1180)

20. Closure Report - The permittee shall submit a closure report to the Director, Valley Regional Office, within 30 days of the date the MSW landfill stopped accepting waste.

(9 VAC 5-50-410 and 40 CFR § 60.757 (d))

- 21. Annual Emission Report for Fee Calculation** - The actual emissions covered by the permit program fees for the preceding year shall be calculated by the owner and submitted to the department by April 15 of each year. The calculations and final amount of emissions are subject to verification and final determination by the department.
(9 VAC 5-80-340 C)

GENERAL CONDITIONS

- 22. Right of Entry** - The permittee shall allow authorized local, state, and federal representatives, upon the presentation of credentials:
- a. To enter upon the permittee's premises on which the facility is located or in which any records are required to be kept under the terms and conditions of this permit;
 - b. To have access to and copy at reasonable times any records required to be kept under the terms and conditions of this permit or the State Air Pollution Control Board Regulations;
 - c. To inspect at reasonable times any facility, equipment, or process subject to the terms and conditions of this permit or the State Air Pollution Control Board Regulations; and
 - d. To sample or test at reasonable times.

For purposes of this condition, the time for inspection shall be deemed reasonable during regular business hours or whenever the facility is in operation. Nothing contained herein shall make an inspection time unreasonable during an emergency.
(9 VAC 5-170-130)

- 23. Notification for Facility or Control Equipment Malfunction** - The permittee shall furnish notification to the Director, Valley Regional Office, of malfunctions of the affected facility or related air pollution control equipment that may cause excess emissions for more than one hour, by facsimile transmission, telephone or telegraph. Such notification shall be made as soon as practicable but not later than four daytime business hours after the malfunction is discovered. The permittee shall provide a written statement giving all pertinent facts, including the estimated duration of the breakdown, within 14 days of the discovery. When the condition causing the failure or malfunction has been corrected and the equipment is again in operation, the permittee shall notify the Director, Valley Regional Office, in writing.
(9 VAC 5-20-180 C)
- 24. Violation of Ambient Air Quality Standard** - The permittee shall, upon request of the DEQ, reduce the level of operation or shut down a facility, as necessary to avoid violating any primary ambient air quality standard and shall not return to normal operation until such time as the ambient air quality standard will not be violated.
(9 VAC 5-20-180 I)

25. Permit Suspension/Revocation - This permit may be suspended or revoked if the permittee:

- a. Knowingly makes material misstatements in the application for this permit or any amendments to it;
- b. Fails to comply with the conditions of this permit;
- c. Fails to comply with any emission standards applicable to the equipment listed in Condition 2;
- d. Causes emissions from this facility which result in violations of, or interferes with the attainment and maintenance of, any ambient air quality standard;
- e. Fails to operate this facility in conformance with any applicable control strategy, including any emission standards or emission limitations, in the State Implementation Plan in effect on the date that the application for this permit is submitted;
- f. Fails to construct or operate this facility in accordance with the application for this permit or any amendments to it; or
- g. Allows the permit to become invalid.

(9 VAC 5-80-1210)

26. Change of Ownership - In the case of a transfer of ownership of a stationary source, the new owner shall abide by any current permit issued to the previous owner. The new owner shall notify the Director, Valley Regional Office, of the change of ownership within 30 days of the transfer.

(9 VAC 5-80-1240)

27. Registration/Update - Annual requirements to fulfill legal obligations to maintain current stationary source emissions data will necessitate a prompt response by the permittee to requests by the DEQ or the Board for information to include, as appropriate: process and production data, changes in control equipment, and operating schedules. Such requests for information from the DEQ will either be in writing or by personal contact. The availability of information submitted to the DEQ or the Board will be governed by applicable provisions of the Freedom of Information Act, §§ 2.1-340 through 2.1-348 of the Code of Virginia, § 10.1-1314 (addressing information provided to the Board) of the Code of Virginia, and 9 VAC 5-170-60 of the State Air Pollution Control Board Regulations. Information provided to federal officials is subject to appropriate federal law and regulations governing confidentiality of such information.

(9 VAC 5-170-60 and 9 VAC 5-20-160)

28. **Permit Copy** - The permittee shall keep a copy of this permit on the premises of the facility to which it applies.
(9 VAC 5-80-1180)

ATTACHMENT D
NMOC Emission Rate Report under Tier 2 NMOC Sampling

SCS ENGINEERS

**NEW SOURCE PERFORMANCE STANDARDS
TIER 2 NMOC EMISSION RATE REPORT**

FOR THE

**SHENANDOAH COUNTY LANDFILL
EDINBURG, VIRGINIA
REGISTRATION NO. 81401**

Presented to:

**VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY
VALLEY REGIONAL OFFICE
4411 Early Road
Harrisonburg, Virginia 22801
(540) 574-7800**

Presented by:

**SCS ENGINEERS
11260 Roger Bacon Drive, Suite 300
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(703) 471-6150**

On Behalf of:

**SHENANDOAH COUNTY, VIRGINIA
349 Landfill Road
Edinburg, Virginia 22824
(540) 984-8573**

DEPT. OF ENVIRONMENTAL QUALITY

AUG 25 2003

**File No. 02201010.00 Task 7
August 21, 2003**



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- D Laboratory Report and Chain of Custody
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INTRODUCTION

On March 12, 1996, the Environmental Protection Agency (EPA) promulgated the New Source Performance Standards (NSPS) and Emissions Guidelines (EG) for new and existing landfills under Section III (b) of the Clean Air Act (CAA). The basis for this legislation is EPA's determination that municipal solid waste (MSW) landfills contribute significant amounts of air pollution that is potentially detrimental to public health. The NSPS are intended to control non-methane organic compound (NMOC) and methanogenic emissions from MSW landfills. NMOCs include volatile organic compounds (VOCs), hazardous air pollutants (HAPs), and odorous compounds. The NSPS applies to landfills having a design capacity greater than 2.5 million Megagrams (Mg) (2.75 million tons) that were permitted, modified, or reconstructed after May 30, 1991 or have accepted waste at any time since November 8, 1987 and have an NMOC emissions rate equal to greater than 50 Mg per year.

The Shenandoah County Landfill (Landfill) is an MSW landfill owned and operated by Shenandoah County, Virginia. The Landfill consists of three distinct waste fill areas: 1) two older and closed areas that have a combined waste footprint of about 8 hectares; 2) the existing active fill area that comprises approximately 5 hectares; and 3) a new Subtitle D expansion area that is permitted but has not yet accepted waste. The total permitted capacity of the Landfill is approximately 5.2 million cubic yards. A passive landfill gas (LFG) vent system has been installed in the existing waste fill area to minimize methane migration and to control odors.

The Landfill is regulated under the NSPS based upon having a design capacity exceeding 2.5 million Mg, having modified its design capacity since May 30, 1991, and based upon a Tier 1 NMOC emission rate calculation that demonstrated an annual NMOC emission rate exceeding 50 Mg (55 tons) per year. As allowed by the NSPS and the Virginia Department of Environmental Quality (VDEQ), the Landfill opted to perform this site-specific Tier 2 NMOC emission rate test to quantify the actual amount of NMOC emissions from the Landfill.

This report was prepared by SCS Engineers (SCS) on behalf of the Landfill to quantify the NMOC emissions for compliance with 40 CFR Part 60 - Subpart WWW by presenting a Tier 2 sampling, analysis, and revised five-year NMOC emissions estimate. This report includes sections describing the field sampling procedures and activities, the results of the laboratory analysis, estimates of annual NMOC emissions, and overall conclusions.

TIER 2 NMOC SAMPLING

SCS performed site-specific (Tier 2) NMOC field sampling at the Shenandoah County Landfill on May 19 and 20, 2003, in accordance with procedures outlined in the NSPS and the Tier 2 sampling protocol submitted to and approved by VDEQ in correspondence dated April 29, 2003. Copies of the SCS sampling protocol and the VDEQ approval letter are included in Appendix A.

Present during the sampling activities were Kristofer Carlson and Mike McCaffrey of SCS, Barry Brandon of VDEQ, and SCS' geoprobe subcontractor, Green Services, Inc. Field equipment used during the sampling activities included a hydraulic, direct push geoprobe (operated by Green personnel), a LandTec® GEM 500 Infrared Gas Analyzer, an EPA Method 25 C approved sampling valve train with an attached pressure gauge and flow meter, a purge pump, and 6-liter stainless steel (SUMMA) sample canisters. Sample locations were chosen by SCS and the Landfill to avoid locations of known non-degradable waste and to be spaced evenly over the landfill area that has waste exceeding two years in age. Based upon the actual field conditions, Tier 2 samples were collected in a sufficient density to cover the landfill areas that had waste exceeding two years in age. Samples were not collected in areas of shallow wastes, in areas where steep landfill side slopes presented a hazard to testing personnel, or in areas where adverse weather conditions made sampling unfeasible. A site map indicating the approximate sampling locations is presented in Appendix B.

In accordance with EPA Method 25 C, the pilot probes were inserted by the direct push method to a depth at least one meter below the landfill cap. The sampling apparatus was then connected to the stainless steel pilot probe, checked for leaks, and purged of ambient air using a purge pump. A schematic of the sampling train is shown in Appendix B. Once LFG readings within the limitations allowed by EPA Method 25C were verified by the GEM 500, approximately 1-liter of LFG was collected at a maximum rate no greater than 500ml/min using the evacuated stainless steel canisters. SCS used the composite sampling method as allowed under 40 CFR Section 60.574(a)(3). Three samples were obtained in each sample canister for a total of 16 samples in 6 canisters by the pilot probe method.

In accordance with the approved protocol, ten existing LFG vents were chosen for Tier 2 sampling in the existing Subtitle D area. The ten vents were sealed with plastic sheeting to prevent ambient air infiltration. A sampling port was installed at the base of each vent. All sampling techniques and equipment used on the LFG vents were identical to that used on the pilot probes. The ten vent samples were composited into four 6-liter sample canisters with each canister having three equal volume samples. Due to an unequal number of samples, one canister contained one sample from a vent and one sample from a probe.

Once sampling was complete, SCS shipped the nine LFG sample canisters to Air Technology Laboratories (ATL) of City of Industry, California for analysis by EPA Method 3C and 25C. Appendix C contains SCS' Tier 2 sampling logs and Appendix D has the chain of custody form.

TIER 2 NMOC LABORATORY ANALYSIS

A laboratory analysis of the LFG samples was performed by ATL using EPA Method 25C for NMOC and Method 3C for nitrogen and oxygen concentrations. Measured NMOC concentrations from the canisters were corrected for moisture, nitrogen, and pressurization of the canister per standard EPA Method 25C procedures. SCS provided ATL with the field conditions (temperature and barometric pressure) at the time of LFG sampling to achieve an accurate calculation of the NMOC concentration. ATL performed all calculations and equipment calibrations (provided in Appendix D).

The NMOC concentrations reported by the laboratory were presented in units of parts per million by volume (ppmv) as carbon. To compute the concentration in units of ppmv as hexane, the lab results were divided by six, per 40 CFR Section 60.754(a)(3). Table 1 presents a summary of the laboratory results for the collected samples. Appendix D presents the full laboratory analysis.

TABLE 1. LABORATORY DATA SUMMARY

Sample Identification Number	No. Samples Per Canister	Nitrogen (%)	Oxygen (%)	NMOC As Carbon (ppmv)	NMOC As hexane (ppmv)
1436-Shen01	3	ND	ND	699	116.5
1362-Shen02	3	ND	ND	888	148
1344-Shen03	3	6.9	1.8	414	69
1351-Shen04	3	ND	ND	652	108.7
1387-Shen05	3	10	2.8	1,700	283.3
1429-Shen06	2	5.9	ND	883	147.2
1407-Shen07	3	ND	ND	1,450	241.7
1374-Shen08	3	3.9	ND	822	137
1396-Shen09	3	15	2.0	1,050	175
Average (Landfill)	26			953.5	158.9

Notes:

1. ND = Not detected at or above reporting limit.
2. The reporting limits for nitrogen and oxygen were 1.0 and 0.5 percent, respectively.
3. The NMOC concentration as carbon was divided by six to obtain the NMOC concentration as hexane.
4. Since the samples within all nine canisters were not equal (i.e., Sample 1429-Shen06), a weighted average approach was used to obtain a representative NMOC concentration.

As shown above, canister 1429-Shen06 only had two samples while the remainder of the canisters had 3 samples. Therefore, a weighted average approach was used to calculate the NMOC concentration for the Landfill. The average NMOC concentration was calculated to be 158.9 ppmv, as hexane.

TIER 2 NMOC EMISSION ESTIMATES

The Tier 2 NMOC emission estimates for years 2003 through 2008 were performed using the U.S. EPA Landfill Gas Emission Model (LandGEM). This model estimates emissions using the equation shown in 40 CFR Section 60.754(a)(1). The model inputs established in Section 60.754(a)(1), the site's field-derived average NMOC concentration, and the refuse fill history of the facility were used to perform the Tier 2 model and are as follows:

- Methane Generation Potential (Lo) – 169.9 m³/Mg. (*Default value cited by NSPS*)
- Methane Generation Rate Constant (k) – 0.05 1/year. (*Default value cited by NSPS*)
- NMOC Concentration – 158.9 ppmv as hexane. (*Field sampling value*)
- Refuse Filling History – The estimates from the period 1972-1992 used in this study are taken from the landfill's Part 70 Air Operating Permit. From 1972 through 1987 the volume of waste accepted was estimated using topographic maps and investigatory borings. For the period from 1988-1991 gate tonnage records were extrapolated from years 1992-1995. Tonnage records provided by the Landfill were used for the years 1992 to 2003. The estimated future waste disposal from 2003 through 2008 was based upon conservatively high projections. The refuse fill history is shown in the LandGEM model in Appendix E.

According to the EPA LandGEM model, the 2003 NMOC emission rate for the Shenandoah County Landfill is 4.9 Mg/year. The model also indicates that, based upon the projected waste filling, the Landfill will not exceed the NSPS threshold (i.e., 50 Mg per year) during this five-year Tier 2 period. A full copy of the Tier II model output indicating the input variables and refuse fill history is included in Appendix E. The five-year NMOC emission rate estimate is shown in Table 2. It should be noted that the LandGEM output is based on January 1 of the year shown.

TABLE 2. NMOC EMISSIONS ESTIMATE

Year	Refuse In-Place (Mg)	NMOC Generation Rates (Mg/yr)
2003	1,000,281	4.9
2004	1,050,281	5.1
2005	1,105,281	5.4
2006	1,165,781	5.6
2007	1,232,331	5.9
2008	1,305,536	6.3

SUMMARY

Since the NMOC emissions estimates for the years 2003 through 2008 are below 50 Mg/year, the Landfill is not required to have a collection/control system in place during this period for NSPS compliance. This includes exemption from the NSPS testing, record keeping,

monitoring, and reporting requirements. However, if the actual waste acceptance at the Landfill alters from the yearly estimates shown in Table 2, an updated NMOC emission rate estimate will be submitted to VDEQ.

This Tier 2 NMOC emissions estimate is valid until May 2008, at which time the Landfill will conduct a Tier 2 re-test of the site-specific NMOC concentration and submit these results and analysis along with a new five-year NMOC emissions estimate to VDEQ.

**APPENDIX E PROJECTED LFG AND NMOC GENERATION RATES
SHENANDOAH COUNTY LANDFILL - EDINBURG, VA**

Year	Disposal Rate (tons/yr)	Refuse In-Place (tons)	Disposal Rate (Mg/yr)	Refuse In-Place (Mg)	Methane Generation Rates (m ³ /yr)	LFG Generation Rates (cfm)	NMOC Generation Rates (tons/yr)	NMOC Generation Rates (Mg/yr)
1972	26,692	0	24,215	0	0.000E+00	0	0	0
1973	26,692	26,692	24,215	24,215	2.057E+05	28	0.26	0.23
1974	26,692	53,384	24,215	48,429	4.014E+05	54	0.50	0.46
1975	26,692	80,076	24,215	72,644	5.875E+05	79	0.74	0.67
1976	26,692	106,768	24,215	96,858	7.646E+05	103	0.96	0.87
1977	26,692	133,460	24,215	121,073	9.330E+05	125	1.17	1.06
1978	26,692	160,152	24,215	145,287	1.093E+06	147	1.37	1.25
1979	26,692	186,844	24,215	169,502	1.248E+06	167	1.56	1.42
1980	26,692	213,536	24,215	193,717	1.391E+06	187	1.75	1.58
1981	26,692	240,228	24,215	217,931	1.528E+06	205	1.92	1.74
1982	26,692	266,920	24,215	242,146	1.660E+06	223	2.08	1.89
1983	26,692	293,612	24,215	266,360	1.784E+06	240	2.24	2.03
1984	26,692	320,304	24,215	290,575	1.903E+06	256	2.39	2.17
1985	26,692	346,996	24,215	314,789	2.016E+06	271	2.53	2.30
1986	26,692	373,688	24,215	339,004	2.123E+06	285	2.67	2.42
1987	26,692	400,380	24,215	363,219	2.225E+06	299	2.79	2.54
1988	36,552	427,072	33,159	387,433	2.323E+06	312	2.92	2.65
1989	36,552	463,624	33,159	420,593	2.491E+06	335	3.13	2.84
1990	36,552	500,176	33,159	453,752	2.651E+06	356	3.33	3.02
1991	36,552	536,728	33,159	486,911	2.804E+06	377	3.52	3.19
1992	34,670	573,280	31,452	520,071	2.949E+06	396	3.70	3.36
1993	35,341	607,950	32,061	551,523	3.072E+06	413	3.86	3.50
1994	39,362	643,291	35,709	583,584	3.194E+06	429	4.01	3.64
1995	36,837	682,653	33,418	619,292	3.342E+06	449	4.20	3.81
1996	40,969	719,490	37,166	652,710	3.483E+06	465	4.35	3.95
1997	37,978	760,459	34,453	689,877	3.610E+06	485	4.53	4.11
1998	38,786	798,437	35,186	724,330	3.726E+06	501	4.68	4.25
1999	39,562	837,223	35,890	759,516	3.844E+06	516	4.83	4.38
2000	40,353	876,785	36,608	795,406	3.961E+06	532	4.97	4.51
2001	41,160	917,138	37,340	832,014	4.079E+06	548	5.12	4.65
2002	41,983	958,298	38,086	869,353	4.197E+06	564	5.27	4.78
2003	50,000	1,000,000	445,359	997,016	4.648E+06	580	5.42	4.92
2004	55,000	1,050,000	495,856	1,047,156	4.910E+06	608	5.64	5.12
2005	60,500	1,105,000	54,835	1,002,694	4.868E+06	631	5.90	5.35
2006	65,500	1,155,000	59,835	1,052,734	4.725E+06	658	6.19	5.62
2007	70,500	1,205,000	64,835	1,102,774	4.582E+06	694	6.54	5.93
2008	80,500	1,305,000	74,835	1,202,814	4.539E+06	741	6.99	6.28
2009	88,578	1,386,082	80,357	1,257,414	5.887E+06	788	7.37	6.68
2010	97,436	1,474,640	88,392	1,337,771	6.264E+06	842	7.87	7.14
2011	107,179	1,572,075	97,232	1,426,163	6.709E+06	902	8.43	7.64
2012	117,897	1,679,255	106,955	1,523,394	7.208E+06	969	9.05	8.21
2013	129,687	1,797,152	117,650	1,630,349	7.765E+06	1,043	9.75	8.85
2014	142,656	1,926,839	129,415	1,747,999	8.386E+06	1,127	10.53	9.55
2015	156,921	2,069,495	142,357	1,877,414	9.078E+06	1,220	11.40	10.34
2016	172,614	2,226,417	156,592	2,019,771	9.843E+06	1,323	12.36	11.21
2017	189,875	2,399,030	172,252	2,176,364	1.069E+07	1,437	13.43	12.18
2018	208,862	2,588,905	189,477	2,348,615	1.163E+07	1,563	14.61	13.25
2019	229,749	2,797,767	208,424	2,538,092	1.268E+07	1,703	15.92	14.44
2020	252,724	3,027,516	229,267	2,746,516	1.383E+07	1,858	17.37	15.75
2021	277,996	3,280,240	252,194	2,975,783	1.510E+07	2,029	18.97	17.21
2022	305,795	3,558,236	277,413	3,227,977	1.651E+07	2,218	20.73	18.81
2023	336,375	3,864,031	305,154	3,505,390	1.806E+07	2,427	22.68	20.57
2024	370,012	4,200,406	335,670	3,810,544	1.977E+07	2,657	24.83	22.52
2025	407,014	4,570,418	369,237	4,146,214	2.166E+07	2,910	27.20	24.67
2026	447,715	4,977,432	406,160	4,515,451	2.374E+07	3,190	29.81	27.04
2027	492,487	5,425,147	446,776	4,921,611	2.603E+07	3,498	32.69	29.66

ESTIMATED NMOC CONCENTRATION IN LFG:

158.9 ppmv

ASSUMED METHANE CONTENT OF LFG:

50%

SELECTED DECAY RATE CONSTANT (k):

0.05

SELECTED ULTIMATE METHANE GENERATION RATE (L₀):

5446.29 ft³/ton

METRIC EQUIVALENT:

170 cu m/Mg

Conversions:

35.314667 cu ft per cu m

1.1023113 ton per Mg

32.037 cu ft/ton per cu m/Mg